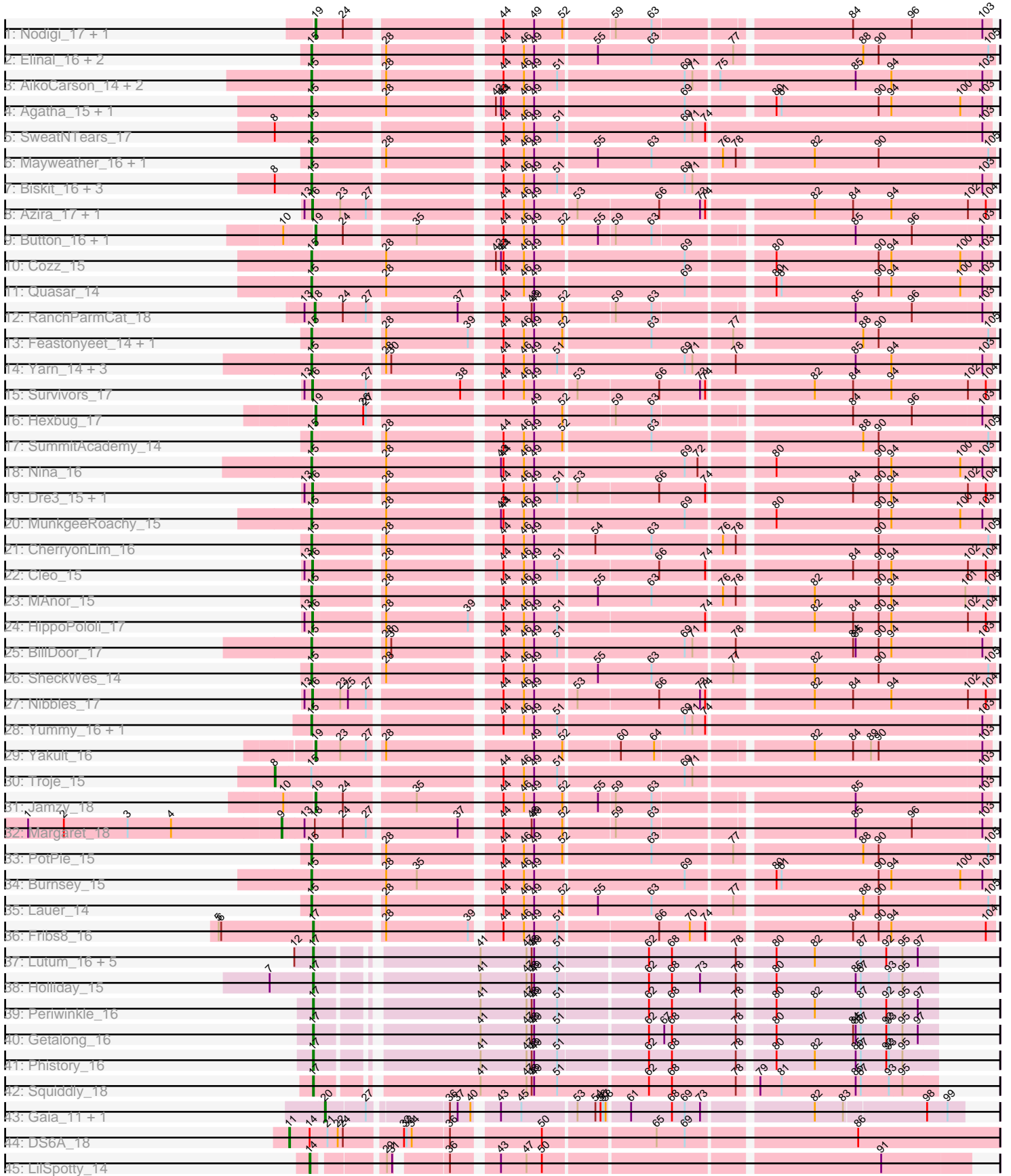


Pham 219704



Note: Tracks are now grouped by subcluster and scaled. Switching in subcluster is indicated by changes in track color. Track scale is now set by default to display the region 30 bp upstream of start 1 to 30 bp downstream of the last possible start. If this default region is judged to be packed too tightly with annotated starts, the track will be further scaled to only show that region of the ORF with annotated starts. This action will be indicated by adding "Zoomed" to the title. For starts, yellow indicates the location of called starts comprised solely of Glimmer/GeneMark auto-annotations, green indicates the location of called starts with at least 1 manual gene annotation.

## Pham 219704 Report

This analysis was run 03/28/25 on database version 593.

Pham number 219704 has 69 members, 0 are drafts.

Phages represented in each track:

- Track 1 : Nodigi\_17, Orla\_17
- Track 2 : Elinal\_16, KayGee\_15, Vine\_16
- Track 3 : AikoCarson\_14, Emalyn\_14, Amok\_14
- Track 4 : Agatha\_15, Axym\_15
- Track 5 : SweatNTears\_17
- Track 6 : Mayweather\_16, Pons\_15
- Track 7 : Biskit\_16, Buttrmlkdreams\_15, SketchMex\_14, MScarn\_17
- Track 8 : Azira\_17, MaVan\_17
- Track 9 : Button\_16, GiKK\_18
- Track 10 : Cozz\_15
- Track 11 : Quasar\_14
- Track 12 : RanchParmCat\_18
- Track 13 : Feastonyeet\_14, BigChungus\_14
- Track 14 : Yarn\_14, SteamedHams\_17, Tolls\_17, AndPeggy\_14
- Track 15 : Survivors\_17
- Track 16 : Hexbug\_17
- Track 17 : SummitAcademy\_14
- Track 18 : Nina\_16
- Track 19 : Dre3\_15, Gibbous\_15
- Track 20 : MunkgeeRoachy\_15
- Track 21 : CherryonLim\_16
- Track 22 : Cleo\_15
- Track 23 : MAnor\_15
- Track 24 : HippoPololi\_17
- Track 25 : BillDoor\_17
- Track 26 : SheckWes\_14
- Track 27 : Nibbles\_17
- Track 28 : Yummy\_16, Horseradish\_16
- Track 29 : Yakult\_16
- Track 30 : Troje\_15
- Track 31 : Jamzy\_18
- Track 32 : Margaret\_18
- Track 33 : PotPie\_15
- Track 34 : Burnsey\_15
- Track 35 : Lauer\_14
- Track 36 : Fribs8\_16

- Track 37 : Lutum\_16, Leroy\_16, Horus\_16, Asapag\_16, BENtherdunthat\_16, Kenna\_15
- Track 38 : Holliday\_15
- Track 39 : Periwinkle\_16
- Track 40 : Getalong\_16
- Track 41 : Phistory\_16
- Track 42 : Squiddly\_18
- Track 43 : Gaia\_11, Nebkiss\_12
- Track 44 : DS6A\_18
- Track 45 : LilSpotty\_14

**Summary of Final Annotations (See graph section above for start numbers):**

The start number called the most often in the published annotations is 15, it was called in 35 of the 69 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Agatha\_15, AikoCarson\_14, Amok\_14, AndPeggy\_14, Axym\_15, BigChungus\_14, BillDoor\_17, Biskit\_16, Burnsey\_15, Buttrmlkdreams\_15, CherryonLim\_16, Cozz\_15, Elinal\_16, Emalyn\_14, Feastonyeet\_14, Horseradish\_16, KayGee\_15, Lauer\_14, MAnor\_15, MScarn\_17, Mayweather\_16, MunkgeeRoachy\_15, Nina\_16, Pons\_15, PotPie\_15, Quasar\_14, SheckWes\_14, SketchMex\_14, SteamedHams\_17, SummitAcademy\_14, SweatNTears\_17, Tolls\_17, Vine\_16, Yarn\_14, Yummy\_16,

Genes that have the "Most Annotated" start but do not call it:

- Troje\_15,

Genes that do not have the "Most Annotated" start:

- Asapag\_16, Azira\_17, BENtherdunthat\_16, Button\_16, Cleo\_15, DS6A\_18, Dre3\_15, Fribs8\_16, Gaia\_11, Getalong\_16, GiKK\_18, Gibbous\_15, Hexbug\_17, HippoPololi\_17, Holliday\_15, Horus\_16, Jamzy\_18, Kenna\_15, Leroy\_16, LilSpotty\_14, Lutum\_16, MaVan\_17, Margaret\_18, Nebkiss\_12, Nibbles\_17, Nodigi\_17, Orla\_17, Periwinkle\_16, Phistory\_16, RanchParmCat\_18, Squiddly\_18, Survivors\_17, Yakult\_16,

**Summary by start number:**

Start 8:

- Found in 6 of 69 ( 8.7% ) of genes in pham
- Manual Annotations of this start: 1 of 69
- Called 16.7% of time when present
- Phage (with cluster) where this start called: Troje\_15 (CT),

Start 9:

- Found in 1 of 69 ( 1.4% ) of genes in pham
- Manual Annotations of this start: 1 of 69
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Margaret\_18 (CT),

Start 11:

- Found in 1 of 69 ( 1.4% ) of genes in pham
- Manual Annotations of this start: 1 of 69
- Called 100.0% of time when present
- Phage (with cluster) where this start called: DS6A\_18 (singleton),

#### Start 14:

- Found in 2 of 69 ( 2.9% ) of genes in pham
- Manual Annotations of this start: 1 of 69
- Called 50.0% of time when present
- Phage (with cluster) where this start called: LilSpotty\_14 (singleton),

#### Start 15:

- Found in 36 of 69 ( 52.2% ) of genes in pham
- Manual Annotations of this start: 35 of 69
- Called 97.2% of time when present
- Phage (with cluster) where this start called: Agatha\_15 (CT), AikoCarson\_14 (CT), Amok\_14 (CT), AndPeggy\_14 (CT), Axym\_15 (CT), BigChungus\_14 (CT), BillDoor\_17 (CT), Biskit\_16 (CT), Burnsey\_15 (CT), Buttrmlkdreams\_15 (CT), CherryonLim\_16 (CT), Cozz\_15 (CT), Elinal\_16 (CT), Emalyn\_14 (CT), Feastonyeet\_14 (CT), Horseradish\_16 (CT), KayGee\_15 (CT), Lauer\_14 (CT), MAnor\_15 (CT), MScarn\_17 (CT), Mayweather\_16 (CT), MunkgeeRoachy\_15 (CT), Nina\_16 (CT), Pons\_15 (CT), PotPie\_15 (CT), Quasar\_14 (CT), SheckWes\_14 (CT), SketchMex\_14 (CT), SteamedHams\_17 (CT), SummitAcademy\_14 (CT), SweatNTears\_17 (CT), Tolls\_17 (CT), Vine\_16 (CT), Yarn\_14 (CT), Yummy\_16 (CT),

#### Start 16:

- Found in 8 of 69 ( 11.6% ) of genes in pham
- Manual Annotations of this start: 8 of 69
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Azira\_17 (CT), Cleo\_15 (CT), Dre3\_15 (CT), Gibbous\_15 (CT), HippoPololi\_17 (CT), MaVan\_17 (CT), Nibbles\_17 (CT), Survivors\_17 (CT),

#### Start 17:

- Found in 12 of 69 ( 17.4% ) of genes in pham
- Manual Annotations of this start: 12 of 69
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Asapag\_16 (DN1), BENtherdunthat\_16 (DN1), Fribs8\_16 (CT), Getalong\_16 (DN1), Holliday\_15 (DN1), Horus\_16 (DN1), Kenna\_15 (DN1), Leroy\_16 (DN1), Lutum\_16 (DN1), Periwinkle\_16 (DN1), Phistory\_16 (DN1), Squiddly\_18 (DN2),

#### Start 18:

- Found in 2 of 69 ( 2.9% ) of genes in pham
- Manual Annotations of this start: 1 of 69
- Called 50.0% of time when present
- Phage (with cluster) where this start called: RanchParmCat\_18 (CT),

#### Start 19:

- Found in 7 of 69 ( 10.1% ) of genes in pham
- Manual Annotations of this start: 7 of 69
- Called 100.0% of time when present

- Phage (with cluster) where this start called: Button\_16 (CT), GiKK\_18 (CT), Hexbug\_17 (CT), Jamzy\_18 (CT), Nodigi\_17 (CT), Orla\_17 (CT), Yakult\_16 (CT),

Start 20:

- Found in 2 of 69 ( 2.9% ) of genes in pham
- Manual Annotations of this start: 2 of 69
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Gaia\_11 (X), Nebkiss\_12 (X),

### **Summary by clusters:**

There are 5 clusters represented in this pham: X, singleton, DN2, DN1, CT,

Info for manual annotations of cluster CT:

- Start number 8 was manually annotated 1 time for cluster CT.
- Start number 9 was manually annotated 1 time for cluster CT.
- Start number 15 was manually annotated 35 times for cluster CT.
- Start number 16 was manually annotated 8 times for cluster CT.
- Start number 17 was manually annotated 1 time for cluster CT.
- Start number 18 was manually annotated 1 time for cluster CT.
- Start number 19 was manually annotated 7 times for cluster CT.

Info for manual annotations of cluster DN1:

- Start number 17 was manually annotated 10 times for cluster DN1.

Info for manual annotations of cluster DN2:

- Start number 17 was manually annotated 1 time for cluster DN2.

Info for manual annotations of cluster X:

- Start number 20 was manually annotated 2 times for cluster X.

### **Gene Information:**

Gene: Agatha\_15 Start: 8885, Stop: 9639, Start Num: 15

Candidate Starts for Agatha\_15:

(Start: 15 @8885 has 35 MA's), (28, 8969), (42, 9083), (43, 9089), (44, 9092), (46, 9116), (49, 9128), (69, 9299), (80, 9389), (81, 9395), (90, 9509), (94, 9524), (100, 9605), (103, 9629),

Gene: AikoCarson\_14 Start: 8613, Stop: 9367, Start Num: 15

Candidate Starts for AikoCarson\_14:

(Start: 15 @8613 has 35 MA's), (28, 8685), (44, 8808), (46, 8832), (49, 8844), (51, 8871), (69, 9015), (71, 9024), (75, 9051), (85, 9210), (94, 9252), (103, 9357),

Gene: Amok\_14 Start: 8613, Stop: 9367, Start Num: 15

Candidate Starts for Amok\_14:

(Start: 15 @8613 has 35 MA's), (28, 8685), (44, 8808), (46, 8832), (49, 8844), (51, 8871), (69, 9015), (71, 9024), (75, 9051), (85, 9210), (94, 9252), (103, 9357),

Gene: AndPeggy\_14 Start: 8901, Stop: 9655, Start Num: 15

Candidate Starts for AndPeggy\_14:

(Start: 15 @8901 has 35 MA's), (28, 8973), (30, 8979), (44, 9096), (46, 9120), (49, 9132), (51, 9159), (69, 9303), (71, 9312), (78, 9357), (85, 9498), (94, 9540), (103, 9645),

Gene: Asapag\_16 Start: 8335, Stop: 9014, Start Num: 17

Candidate Starts for Asapag\_16:

(12, 8314), (Start: 17 @8335 has 12 MA's), (41, 8500), (47, 8554), (48, 8560), (49, 8563), (51, 8590), (62, 8689), (68, 8716), (78, 8791), (80, 8827), (82, 8872), (87, 8926), (92, 8956), (95, 8974), (97, 8992),

Gene: Axym\_15 Start: 8885, Stop: 9639, Start Num: 15

Candidate Starts for Axym\_15:

(Start: 15 @8885 has 35 MA's), (28, 8969), (42, 9083), (43, 9089), (44, 9092), (46, 9116), (49, 9128), (69, 9299), (80, 9389), (81, 9395), (90, 9509), (94, 9524), (100, 9605), (103, 9629),

Gene: Azira\_17 Start: 9884, Stop: 10629, Start Num: 16

Candidate Starts for Azira\_17:

(13, 9875), (Start: 16 @9884 has 8 MA's), (23, 9914), (27, 9944), (44, 10079), (46, 10103), (49, 10115), (53, 10160), (66, 10253), (73, 10301), (74, 10307), (82, 10418), (84, 10463), (94, 10508), (102, 10598), (104, 10619),

Gene: BENtherdunthat\_16 Start: 8335, Stop: 9014, Start Num: 17

Candidate Starts for BENtherdunthat\_16:

(12, 8314), (Start: 17 @8335 has 12 MA's), (41, 8500), (47, 8554), (48, 8560), (49, 8563), (51, 8590), (62, 8689), (68, 8716), (78, 8791), (80, 8827), (82, 8872), (87, 8926), (92, 8956), (95, 8974), (97, 8992),

Gene: BigChungus\_14 Start: 8662, Stop: 9410, Start Num: 15

Candidate Starts for BigChungus\_14:

(Start: 15 @8662 has 35 MA's), (28, 8734), (39, 8830), (44, 8857), (46, 8881), (49, 8893), (52, 8926), (63, 9025), (77, 9115), (88, 9256), (90, 9274), (105, 9403),

Gene: BillDoor\_17 Start: 8866, Stop: 9620, Start Num: 15

Candidate Starts for BillDoor\_17:

(Start: 15 @8866 has 35 MA's), (28, 8938), (30, 8944), (44, 9061), (46, 9085), (49, 9097), (51, 9124), (69, 9268), (71, 9277), (78, 9322), (84, 9460), (85, 9463), (90, 9490), (94, 9505), (103, 9610),

Gene: Biskit\_16 Start: 8872, Stop: 9626, Start Num: 15

Candidate Starts for Biskit\_16:

(Start: 8 @8830 has 1 MA's), (Start: 15 @8872 has 35 MA's), (44, 9067), (46, 9091), (49, 9103), (51, 9130), (69, 9274), (71, 9283), (103, 9616),

Gene: Burnsey\_15 Start: 8886, Stop: 9640, Start Num: 15

Candidate Starts for Burnsey\_15:

(Start: 15 @8886 has 35 MA's), (28, 8970), (35, 9006), (44, 9093), (46, 9117), (49, 9129), (69, 9300), (80, 9390), (81, 9396), (90, 9510), (94, 9525), (100, 9606), (103, 9630),

Gene: Button\_16 Start: 8897, Stop: 9627, Start Num: 19

Candidate Starts for Button\_16:

(10, 8864), (Start: 19 @8897 has 7 MA's), (24, 8927), (35, 9002), (44, 9089), (46, 9113), (49, 9125), (52, 9158), (55, 9194), (59, 9212), (63, 9254), (85, 9470), (96, 9536), (103, 9617),

Gene: Buttrmlkdreams\_15 Start: 8857, Stop: 9611, Start Num: 15

Candidate Starts for Buttrmlkdreams\_15:

(Start: 8 @8815 has 1 MA's), (Start: 15 @8857 has 35 MA's), (44, 9052), (46, 9076), (49, 9088), (51, 9115), (69, 9259), (71, 9268), (103, 9601),

Gene: CherryonLim\_16 Start: 9392, Stop: 10140, Start Num: 15

Candidate Starts for CherryonLim\_16:

(Start: 15 @9392 has 35 MA's), (28, 9464), (44, 9587), (46, 9611), (49, 9623), (54, 9689), (63, 9755), (76, 9833), (78, 9848), (90, 10004), (105, 10133),

Gene: Cleo\_15 Start: 9174, Stop: 9919, Start Num: 16

Candidate Starts for Cleo\_15:

(13, 9165), (Start: 16 @9174 has 8 MA's), (28, 9246), (44, 9369), (46, 9393), (49, 9405), (51, 9432), (66, 9543), (74, 9597), (84, 9753), (90, 9783), (94, 9798), (102, 9888), (104, 9909),

Gene: Cozz\_15 Start: 8886, Stop: 9640, Start Num: 15

Candidate Starts for Cozz\_15:

(Start: 15 @8886 has 35 MA's), (28, 8970), (42, 9084), (43, 9090), (44, 9093), (46, 9117), (49, 9129), (69, 9300), (80, 9390), (90, 9510), (94, 9525), (100, 9606), (103, 9630),

Gene: DS6A\_18 Start: 11578, Stop: 12356, Start Num: 11

Candidate Starts for DS6A\_18:

(Start: 11 @11578 has 1 MA's), (Start: 14 @11602 has 1 MA's), (21, 11623), (22, 11635), (24, 11641), (32, 11704), (33, 11707), (34, 11713), (36, 11755), (50, 11848), (65, 11971), (69, 12004), (86, 12190),

Gene: Dre3\_15 Start: 9121, Stop: 9866, Start Num: 16

Candidate Starts for Dre3\_15:

(13, 9112), (Start: 16 @9121 has 8 MA's), (28, 9193), (44, 9316), (46, 9340), (49, 9352), (51, 9379), (53, 9397), (66, 9490), (74, 9544), (84, 9700), (90, 9730), (94, 9745), (102, 9835), (104, 9856),

Gene: Elinal\_16 Start: 8643, Stop: 9391, Start Num: 15

Candidate Starts for Elinal\_16:

(Start: 15 @8643 has 35 MA's), (28, 8715), (44, 8838), (46, 8862), (49, 8874), (55, 8943), (63, 9006), (77, 9096), (88, 9237), (90, 9255), (105, 9384),

Gene: Emalyn\_14 Start: 8612, Stop: 9366, Start Num: 15

Candidate Starts for Emalyn\_14:

(Start: 15 @8612 has 35 MA's), (28, 8684), (44, 8807), (46, 8831), (49, 8843), (51, 8870), (69, 9014), (71, 9023), (75, 9050), (85, 9209), (94, 9251), (103, 9356),

Gene: Feastonyeet\_14 Start: 8662, Stop: 9410, Start Num: 15

Candidate Starts for Feastonyeet\_14:

(Start: 15 @8662 has 35 MA's), (28, 8734), (39, 8830), (44, 8857), (46, 8881), (49, 8893), (52, 8926), (63, 9025), (77, 9115), (88, 9256), (90, 9274), (105, 9403),

Gene: Fribs8\_16 Start: 9689, Stop: 10434, Start Num: 17

Candidate Starts for Fribs8\_16:

(5, 9578), (6, 9581), (Start: 17 @9689 has 12 MA's), (28, 9761), (39, 9857), (44, 9884), (46, 9908), (49, 9920), (51, 9947), (66, 10058), (70, 10094), (74, 10112), (84, 10268), (90, 10298), (94, 10313), (104, 10424),

Gene: Gaia\_11 Start: 8760, Stop: 9442, Start Num: 20

Candidate Starts for Gaia\_11:

(Start: 20 @8760 has 2 MA's), (27, 8805), (36, 8889), (37, 8898), (40, 8913), (43, 8934), (45, 8958), (53, 9018), (54, 9039), (56, 9045), (57, 9048), (58, 9051), (61, 9075), (68, 9123), (69, 9138), (73, 9156), (82, 9273), (83, 9306), (98, 9399), (99, 9423),

Gene: Getalong\_16 Start: 8315, Stop: 8997, Start Num: 17

Candidate Starts for Getalong\_16:

(Start: 17 @8315 has 12 MA's), (41, 8480), (47, 8534), (48, 8540), (49, 8543), (51, 8570), (62, 8672), (67, 8690), (68, 8699), (78, 8774), (80, 8810), (84, 8900), (85, 8903), (87, 8909), (92, 8939), (93, 8942), (95, 8957), (97, 8975),

Gene: GiKK\_18 Start: 9200, Stop: 9930, Start Num: 19

Candidate Starts for GiKK\_18:

(10, 9167), (Start: 19 @9200 has 7 MA's), (24, 9230), (35, 9305), (44, 9392), (46, 9416), (49, 9428), (52, 9461), (55, 9497), (59, 9515), (63, 9557), (85, 9773), (96, 9839), (103, 9920),

Gene: Gibbous\_15 Start: 9121, Stop: 9866, Start Num: 16

Candidate Starts for Gibbous\_15:

(13, 9112), (Start: 16 @9121 has 8 MA's), (28, 9193), (44, 9316), (46, 9340), (49, 9352), (51, 9379), (53, 9397), (66, 9490), (74, 9544), (84, 9700), (90, 9730), (94, 9745), (102, 9835), (104, 9856),

Gene: Hexbug\_17 Start: 9883, Stop: 10613, Start Num: 19

Candidate Starts for Hexbug\_17:

(Start: 19 @9883 has 7 MA's), (26, 9937), (27, 9940), (49, 10111), (52, 10144), (59, 10198), (63, 10240), (84, 10453), (96, 10522), (103, 10603),

Gene: HippoPololi\_17 Start: 9778, Stop: 10523, Start Num: 16

Candidate Starts for HippoPololi\_17:

(13, 9769), (Start: 16 @9778 has 8 MA's), (28, 9850), (39, 9946), (44, 9973), (46, 9997), (49, 10009), (51, 10036), (74, 10201), (82, 10312), (84, 10357), (90, 10387), (94, 10402), (102, 10492), (104, 10513),

Gene: Holliday\_15 Start: 8319, Stop: 8998, Start Num: 17

Candidate Starts for Holliday\_15:

(7, 8271), (Start: 17 @8319 has 12 MA's), (41, 8484), (47, 8538), (48, 8544), (49, 8547), (51, 8574), (62, 8673), (68, 8700), (73, 8733), (78, 8775), (80, 8811), (85, 8904), (87, 8910), (93, 8943), (95, 8958),

Gene: Horseradish\_16 Start: 8771, Stop: 9525, Start Num: 15

Candidate Starts for Horseradish\_16:

(Start: 15 @8771 has 35 MA's), (44, 8966), (46, 8990), (49, 9002), (51, 9029), (69, 9173), (71, 9182), (74, 9197), (103, 9515),

Gene: Horus\_16 Start: 8335, Stop: 9014, Start Num: 17

Candidate Starts for Horus\_16:

(12, 8314), (Start: 17 @8335 has 12 MA's), (41, 8500), (47, 8554), (48, 8560), (49, 8563), (51, 8590), (62, 8689), (68, 8716), (78, 8791), (80, 8827), (82, 8872), (87, 8926), (92, 8956), (95, 8974), (97, 8992),

Gene: Jamzy\_18 Start: 9210, Stop: 9940, Start Num: 19

Candidate Starts for Jamzy\_18:

(10, 9177), (Start: 19 @9210 has 7 MA's), (24, 9240), (35, 9315), (44, 9402), (46, 9426), (49, 9438), (52, 9471), (55, 9507), (59, 9525), (63, 9567), (85, 9783), (103, 9930),

Gene: KayGee\_15 Start: 8643, Stop: 9391, Start Num: 15

Candidate Starts for KayGee\_15:

(Start: 15 @8643 has 35 MA's), (28, 8715), (44, 8838), (46, 8862), (49, 8874), (55, 8943), (63, 9006), (77, 9096), (88, 9237), (90, 9255), (105, 9384),

Gene: Kenna\_15 Start: 8335, Stop: 9014, Start Num: 17



Candidate Starts for Kenna\_15:

(12, 8314), (Start: 17 @8335 has 12 MA's), (41, 8500), (47, 8554), (48, 8560), (49, 8563), (51, 8590), (62, 8689), (68, 8716), (78, 8791), (80, 8827), (82, 8872), (87, 8926), (92, 8956), (95, 8974), (97, 8992),

Gene: Lauer\_14 Start: 8692, Stop: 9440, Start Num: 15

Candidate Starts for Lauer\_14:

(Start: 15 @8692 has 35 MA's), (28, 8764), (44, 8887), (46, 8911), (49, 8923), (52, 8956), (55, 8992), (63, 9055), (77, 9145), (88, 9286), (90, 9304), (105, 9433),

Gene: Leroy\_16 Start: 8336, Stop: 9015, Start Num: 17

Candidate Starts for Leroy\_16:

(12, 8315), (Start: 17 @8336 has 12 MA's), (41, 8501), (47, 8555), (48, 8561), (49, 8564), (51, 8591), (62, 8690), (68, 8717), (78, 8792), (80, 8828), (82, 8873), (87, 8927), (92, 8957), (95, 8975), (97, 8993),

Gene: LilSpotty\_14 Start: 8433, Stop: 9124, Start Num: 14

Candidate Starts for LilSpotty\_14:

(Start: 14 @8433 has 1 MA's), (29, 8502), (31, 8508), (36, 8559), (43, 8604), (47, 8634), (50, 8652), (91, 9021),

Gene: Lutum\_16 Start: 8335, Stop: 9014, Start Num: 17

Candidate Starts for Lutum\_16:

(12, 8314), (Start: 17 @8335 has 12 MA's), (41, 8500), (47, 8554), (48, 8560), (49, 8563), (51, 8590), (62, 8689), (68, 8716), (78, 8791), (80, 8827), (82, 8872), (87, 8926), (92, 8956), (95, 8974), (97, 8992),

Gene: MAnor\_15 Start: 8635, Stop: 9383, Start Num: 15

Candidate Starts for MAnor\_15:

(Start: 15 @8635 has 35 MA's), (28, 8707), (44, 8830), (46, 8854), (49, 8866), (55, 8935), (63, 8998), (76, 9076), (78, 9091), (82, 9172), (90, 9247), (94, 9262), (101, 9349), (105, 9376),

Gene: MScarn\_17 Start: 8857, Stop: 9611, Start Num: 15

Candidate Starts for MScarn\_17:

(Start: 8 @8815 has 1 MA's), (Start: 15 @8857 has 35 MA's), (44, 9052), (46, 9076), (49, 9088), (51, 9115), (69, 9259), (71, 9268), (103, 9601),

Gene: MaVan\_17 Start: 9884, Stop: 10629, Start Num: 16

Candidate Starts for MaVan\_17:

(13, 9875), (Start: 16 @9884 has 8 MA's), (23, 9914), (27, 9944), (44, 10079), (46, 10103), (49, 10115), (53, 10160), (66, 10253), (73, 10301), (74, 10307), (82, 10418), (84, 10463), (94, 10508), (102, 10598), (104, 10619),

Gene: Margaret\_18 Start: 9558, Stop: 10321, Start Num: 9

Candidate Starts for Margaret\_18:

(1, 9264), (2, 9306), (3, 9381), (4, 9432), (Start: 9 @9558 has 1 MA's), (13, 9582), (Start: 18 @9591 has 1 MA's), (24, 9621), (27, 9648), (37, 9744), (44, 9783), (48, 9816), (49, 9819), (52, 9852), (59, 9906), (63, 9948), (85, 10164), (96, 10230), (103, 10311),

Gene: Mayweather\_16 Start: 9265, Stop: 10013, Start Num: 15

Candidate Starts for Mayweather\_16:

(Start: 15 @9265 has 35 MA's), (28, 9337), (44, 9460), (46, 9484), (49, 9496), (55, 9565), (63, 9628), (76, 9706), (78, 9721), (82, 9802), (90, 9877), (105, 10006),

Gene: MunkgeeRoachy\_15 Start: 8933, Stop: 9687, Start Num: 15

Candidate Starts for MunkgeeRoachy\_15:

(Start: 15 @8933 has 35 MA's), (28, 9017), (43, 9137), (44, 9140), (46, 9164), (49, 9176), (69, 9347), (80, 9437), (90, 9557), (94, 9572), (100, 9653), (103, 9677),

Gene: Nebkiss\_12 Start: 8761, Stop: 9443, Start Num: 20

Candidate Starts for Nebkiss\_12:

(Start: 20 @8761 has 2 MA's), (27, 8806), (36, 8890), (37, 8899), (40, 8914), (43, 8935), (45, 8959), (53, 9019), (54, 9040), (56, 9046), (57, 9049), (58, 9052), (61, 9076), (68, 9124), (69, 9139), (73, 9157), (82, 9274), (83, 9307), (98, 9400), (99, 9424),

Gene: Nibbles\_17 Start: 9884, Stop: 10629, Start Num: 16

Candidate Starts for Nibbles\_17:

(13, 9875), (Start: 16 @9884 has 8 MA's), (23, 9914), (25, 9923), (27, 9944), (44, 10079), (46, 10103), (49, 10115), (53, 10160), (66, 10253), (73, 10301), (74, 10307), (82, 10418), (84, 10463), (94, 10508), (102, 10598), (104, 10619),

Gene: Nina\_16 Start: 9918, Stop: 10672, Start Num: 15

Candidate Starts for Nina\_16:

(Start: 15 @9918 has 35 MA's), (28, 10002), (43, 10122), (44, 10125), (46, 10149), (49, 10161), (69, 10332), (72, 10347), (80, 10422), (90, 10542), (94, 10557), (100, 10638), (103, 10662),

Gene: Nodigi\_17 Start: 9874, Stop: 10604, Start Num: 19

Candidate Starts for Nodigi\_17:

(Start: 19 @9874 has 7 MA's), (24, 9904), (44, 10066), (49, 10102), (52, 10135), (59, 10189), (63, 10231), (84, 10444), (96, 10513), (103, 10594),

Gene: Orla\_17 Start: 9878, Stop: 10608, Start Num: 19

Candidate Starts for Orla\_17:

(Start: 19 @9878 has 7 MA's), (24, 9908), (44, 10070), (49, 10106), (52, 10139), (59, 10193), (63, 10235), (84, 10448), (96, 10517), (103, 10598),

Gene: Periwinkle\_16 Start: 8315, Stop: 8994, Start Num: 17

Candidate Starts for Periwinkle\_16:

(Start: 17 @8315 has 12 MA's), (41, 8480), (47, 8534), (48, 8540), (49, 8543), (51, 8570), (62, 8669), (68, 8696), (78, 8771), (80, 8807), (82, 8852), (87, 8906), (92, 8936), (95, 8954), (97, 8972),

Gene: Phistory\_16 Start: 8304, Stop: 8983, Start Num: 17

Candidate Starts for Phistory\_16:

(Start: 17 @8304 has 12 MA's), (41, 8469), (47, 8523), (48, 8529), (49, 8532), (51, 8559), (62, 8658), (68, 8685), (78, 8760), (80, 8796), (82, 8841), (85, 8889), (87, 8895), (92, 8925), (93, 8928), (95, 8943),

Gene: Pons\_15 Start: 8643, Stop: 9391, Start Num: 15

Candidate Starts for Pons\_15:

(Start: 15 @8643 has 35 MA's), (28, 8715), (44, 8838), (46, 8862), (49, 8874), (55, 8943), (63, 9006), (76, 9084), (78, 9099), (82, 9180), (90, 9255), (105, 9384),

Gene: PotPie\_15 Start: 9496, Stop: 10244, Start Num: 15

Candidate Starts for PotPie\_15:

(Start: 15 @9496 has 35 MA's), (28, 9568), (44, 9691), (46, 9715), (49, 9727), (52, 9760), (63, 9859), (77, 9949), (88, 10090), (90, 10108), (105, 10237),

Gene: Quasar\_14 Start: 9494, Stop: 10248, Start Num: 15

Candidate Starts for Quasar\_14:

(Start: 15 @9494 has 35 MA's), (28, 9578), (44, 9701), (46, 9725), (49, 9737), (69, 9908), (80, 9998), (81, 10004), (90, 10118), (94, 10133), (100, 10214), (103, 10238),

Gene: RanchParmCat\_18 Start: 9591, Stop: 10321, Start Num: 18

Candidate Starts for RanchParmCat\_18:

(13, 9582), (Start: 18 @9591 has 1 MA's), (24, 9621), (27, 9648), (37, 9744), (44, 9783), (48, 9816), (49, 9819), (52, 9852), (59, 9906), (63, 9948), (85, 10164), (96, 10230), (103, 10311),

Gene: SheckWes\_14 Start: 8631, Stop: 9379, Start Num: 15

Candidate Starts for SheckWes\_14:

(Start: 15 @8631 has 35 MA's), (28, 8703), (44, 8826), (46, 8850), (49, 8862), (55, 8931), (63, 8994), (77, 9084), (82, 9168), (90, 9243), (105, 9372),

Gene: SketchMex\_14 Start: 8872, Stop: 9626, Start Num: 15

Candidate Starts for SketchMex\_14:

(Start: 8 @8830 has 1 MA's), (Start: 15 @8872 has 35 MA's), (44, 9067), (46, 9091), (49, 9103), (51, 9130), (69, 9274), (71, 9283), (103, 9616),

Gene: Squiddly\_18 Start: 9737, Stop: 10419, Start Num: 17

Candidate Starts for Squiddly\_18:

(Start: 17 @9737 has 12 MA's), (41, 9902), (47, 9956), (48, 9962), (49, 9965), (51, 9992), (62, 10094), (68, 10121), (78, 10196), (79, 10214), (81, 10238), (85, 10325), (87, 10331), (93, 10364), (95, 10379),

Gene: SteamedHams\_17 Start: 8902, Stop: 9656, Start Num: 15

Candidate Starts for SteamedHams\_17:

(Start: 15 @8902 has 35 MA's), (28, 8974), (30, 8980), (44, 9097), (46, 9121), (49, 9133), (51, 9160), (69, 9304), (71, 9313), (78, 9358), (85, 9499), (94, 9541), (103, 9646),

Gene: SummitAcademy\_14 Start: 8711, Stop: 9459, Start Num: 15

Candidate Starts for SummitAcademy\_14:

(Start: 15 @8711 has 35 MA's), (28, 8783), (44, 8906), (46, 8930), (49, 8942), (52, 8975), (63, 9074), (88, 9305), (90, 9323), (105, 9452),

Gene: Survivors\_17 Start: 9739, Stop: 10484, Start Num: 16

Candidate Starts for Survivors\_17:

(13, 9730), (Start: 16 @9739 has 8 MA's), (27, 9799), (38, 9898), (44, 9934), (46, 9958), (49, 9970), (53, 10015), (66, 10108), (73, 10156), (74, 10162), (82, 10273), (84, 10318), (94, 10363), (102, 10453), (104, 10474),

Gene: SweatNTears\_17 Start: 9383, Stop: 10137, Start Num: 15

Candidate Starts for SweatNTears\_17:

(Start: 8 @9341 has 1 MA's), (Start: 15 @9383 has 35 MA's), (44, 9578), (46, 9602), (49, 9614), (51, 9641), (69, 9785), (71, 9794), (74, 9809), (103, 10127),

Gene: Tolls\_17 Start: 8905, Stop: 9659, Start Num: 15

Candidate Starts for Tolls\_17:

(Start: 15 @8905 has 35 MA's), (28, 8977), (30, 8983), (44, 9100), (46, 9124), (49, 9136), (51, 9163), (69, 9307), (71, 9316), (78, 9361), (85, 9502), (94, 9544), (103, 9649),

Gene: Troje\_15 Start: 8815, Stop: 9611, Start Num: 8

Candidate Starts for Troje\_15:

(Start: 8 @8815 has 1 MA's), (Start: 15 @8857 has 35 MA's), (44, 9052), (46, 9076), (49, 9088), (51, 9115), (69, 9259), (71, 9268), (103, 9601),

Gene: Vine\_16 Start: 9640, Stop: 10388, Start Num: 15

Candidate Starts for Vine\_16:

(Start: 15 @9640 has 35 MA's), (28, 9712), (44, 9835), (46, 9859), (49, 9871), (55, 9940), (63, 10003), (77, 10093), (88, 10234), (90, 10252), (105, 10381),

Gene: Yakult\_16 Start: 8776, Stop: 9506, Start Num: 19

Candidate Starts for Yakult\_16:

(Start: 19 @8776 has 7 MA's), (23, 8803), (27, 8833), (28, 8845), (49, 9004), (52, 9037), (60, 9097), (64, 9136), (82, 9301), (84, 9346), (89, 9367), (90, 9376), (103, 9496),

Gene: Yarn\_14 Start: 8895, Stop: 9649, Start Num: 15

Candidate Starts for Yarn\_14:

(Start: 15 @8895 has 35 MA's), (28, 8967), (30, 8973), (44, 9090), (46, 9114), (49, 9126), (51, 9153), (69, 9297), (71, 9306), (78, 9351), (85, 9492), (94, 9534), (103, 9639),

Gene: Yummy\_16 Start: 8771, Stop: 9525, Start Num: 15

Candidate Starts for Yummy\_16:

(Start: 15 @8771 has 35 MA's), (44, 8966), (46, 8990), (49, 9002), (51, 9029), (69, 9173), (71, 9182), (74, 9197), (103, 9515),